



*Setting the Standard for Automation™*

# How to make CEMS more affordable

Technologies for higher efficiency in  
emission monitoring

Standards

Certification

Education & Training

Publishing

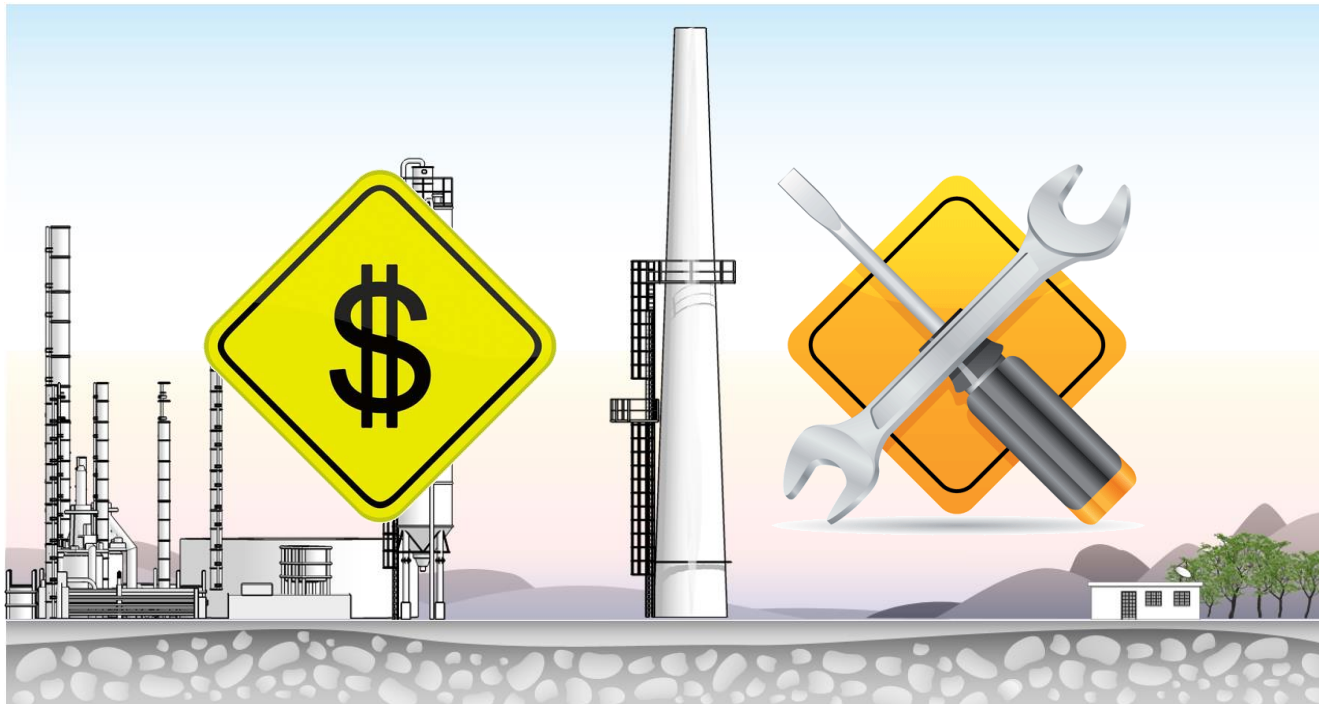
Conferences & Exhibits

- Dipl-Ing. Thomas Weyrauch
- Areas Sales and Business Development Manager for Asia, India, Middle East and Africa
- Since 30 years in Analytical business
- From R&D, product management, marketing, training to sales
- Living in Frankfurt, Germany



# Your plant has to be operated most efficiently ...

- ... means highest availability at minimum cost for CEMS



## Issues

### Primary

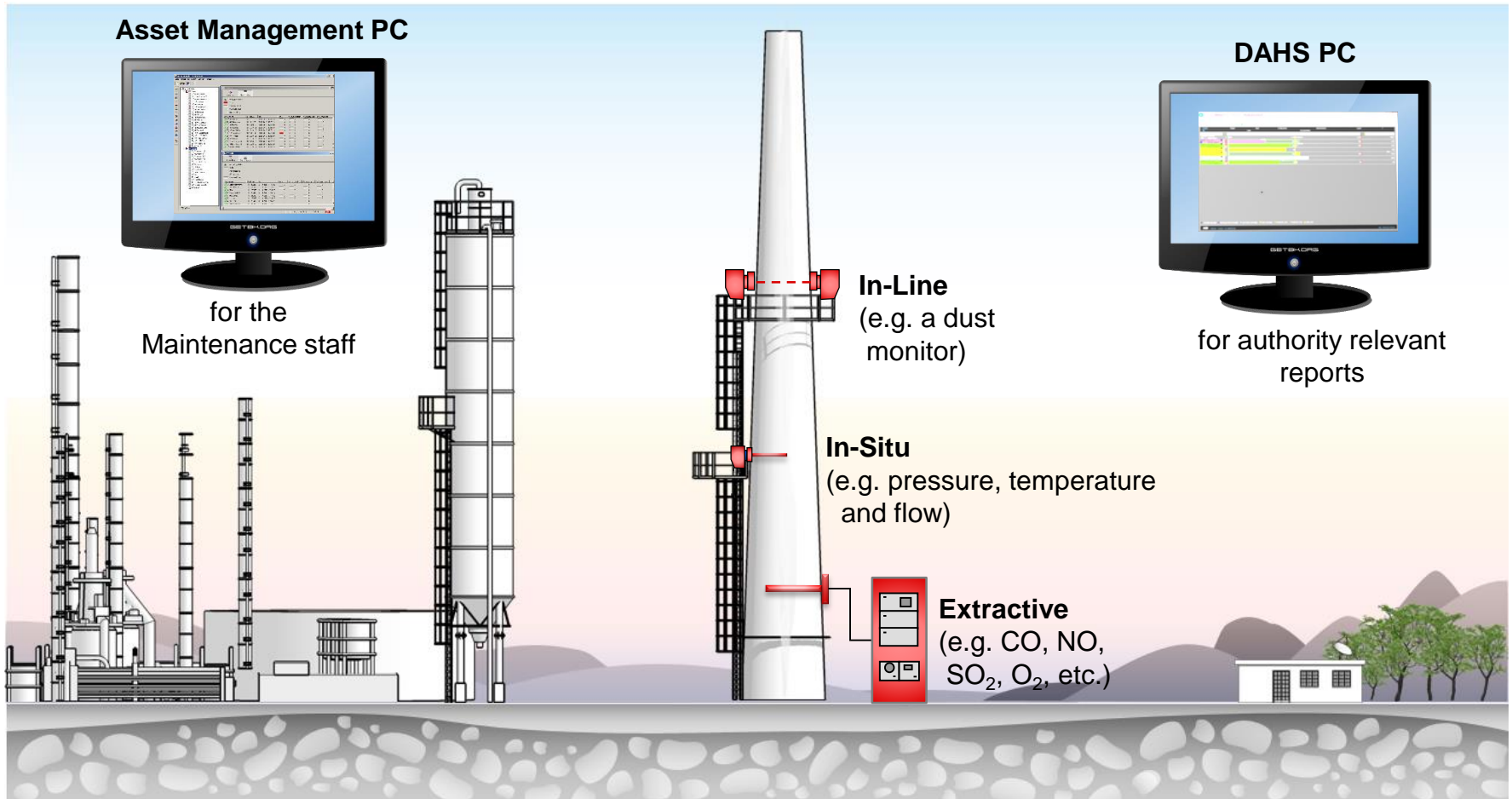
- Products meet technical specifications

### Secondary

- Availability of documentation
- Training efforts
- Availability of CEMS
- OPEX cost
- Safety issues
- Supplier Services

Tasks	Responsibility	Europe	USA
① <b>Type approval</b> and initial / periodic <b>manufacturer</b> <b>audits</b>	CEMS supplier	QAL1	-
② <b>At site</b> <b>compliance test</b>	Plant operator (tasks conducted by accredited test lab.!)	QAL2 (initial, 3...5 years) AST (annual surveillance test)	Performance Specs 1...16 (initial, quaterly ... annually)
③ <b>Ongoing QA / QC</b>	Plant operator	QAL3 (drift and precision checks at zero and span within the maintenance intervall)	40 CFR Part 60 Appendix F (e.g. daily calibration checks)

# Components for Continuous Emission Monitoring (CEM)



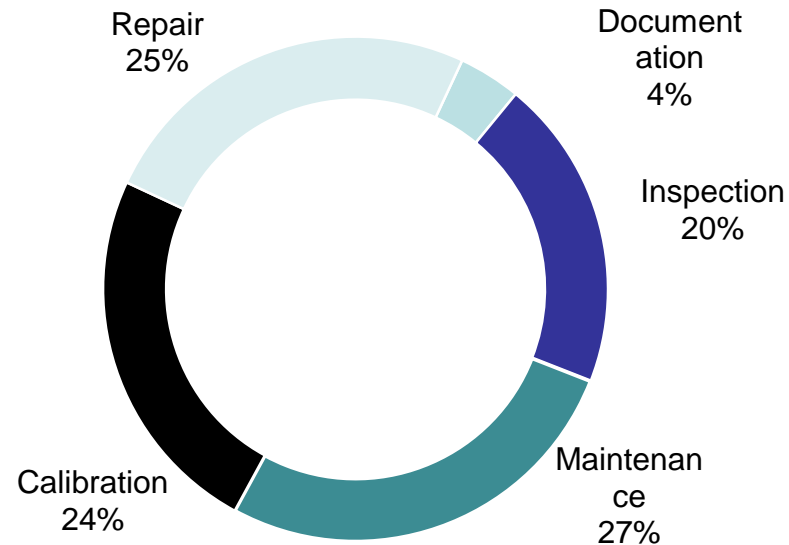
# Cost analysis

## Strategies to increase availability and economics

### Cost composition

- 1/3 equipment costs
- 2/3 operating cost
  - Inspections
  - Maintenance
  - Calibrations
  - Repair

### Operating cost



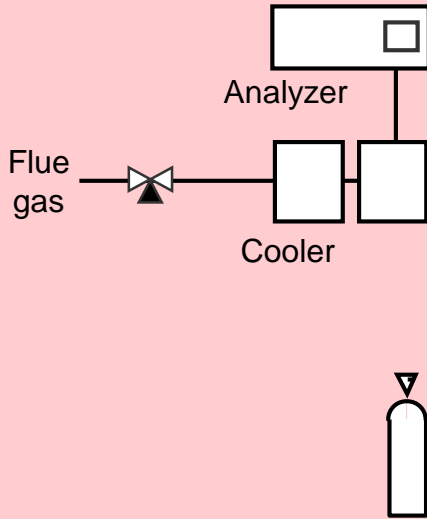
When selecting a solution, the total costs must be considered

# Calibration costs

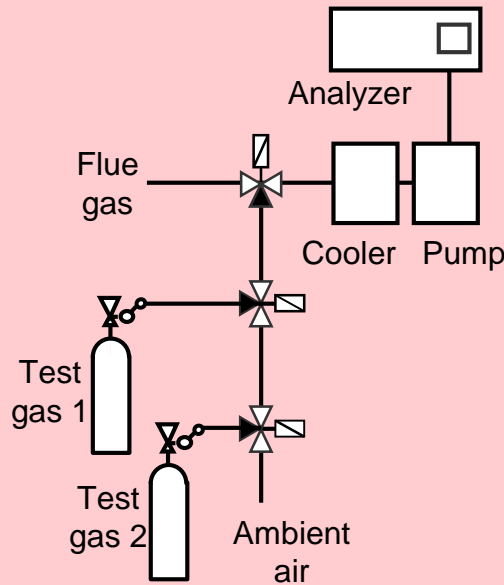
## Save money on using today's technologies



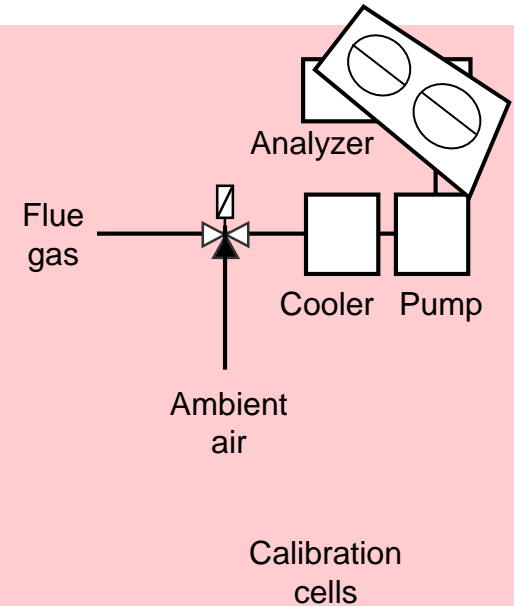
### Manual



### Automated



### Automated with Calibration Cells



Calibration cells minimize operating costs and avoid the handling of test gases

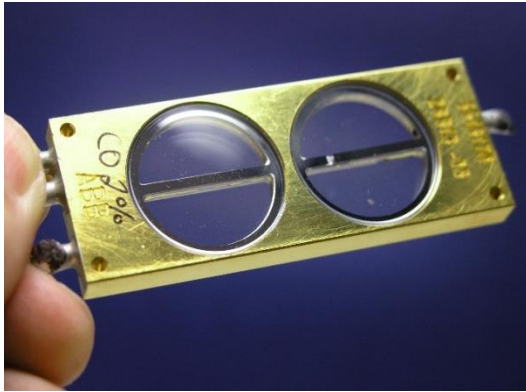


# Calibration cells

## Some more details

### Manufacturing

- Gas-filled cell
- Tightness guaranteed by sputter and soldering technique
- High lifetime
- Almost 30 years manufacturing experience



### Suitability

- Calibration cells are an alternative to flowing test gas
- Suitable according **EN 14181** and PS\* 2, PS 3, and PS 4 of **US EPA**

DIN EN 14181		DIN
Diese Norm ist Bestandteil des VDI/DIN-Handbuchs Reinhaltung der Luft, Band 5 ICS 13.040.40 Ersatz für DIN EN 14181:2004-09		
<b>Emissionen aus stationären Quellen – Qualitätssicherung für automatische Messeinrichtungen; Deutsche Fassung EN 14181:2014</b>		
Stationary source emissions – Quality assurance of automated measuring systems; German version EN 14181:2014		
Emission des sources fixes – Assurance qualité des systèmes automatiques de mesure; Version allemande EN 14181:2014		

### Proven technology

- Long-term stability tested by TÜV
- **Certified** acc. EN 15267



# Root cause analysis for CEMS upsets

## Improve uptime



The complete CEMS need to be engineered by an experienced supplier

# Maintenance strategies

## the right choice will save money

### Types of maintenance

65% corrective

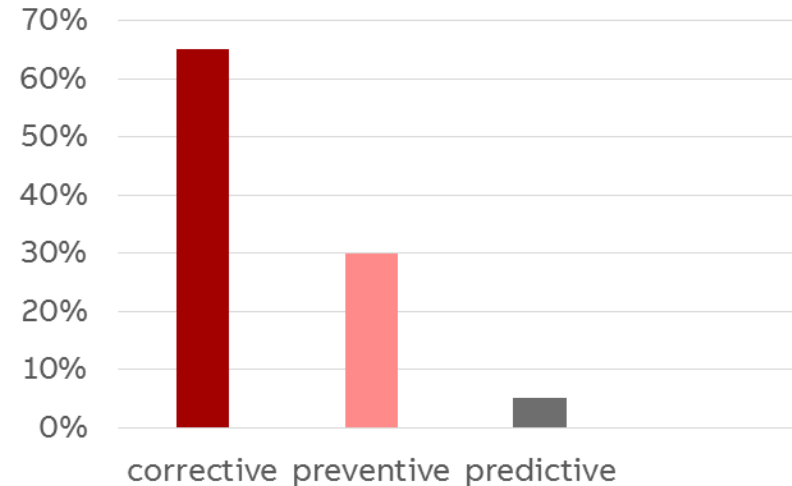
- Occurs after the problem  
⇒ Influence on operation, plant, environment, staff, downtimes

30% preventive

- According to schedule, whether necessary or not  
⇒ Influence on availability (60% unnecessary)

5% predictive

⇒ Ideal



CEMS condition monitoring reduce down-time and increase economics

# The solution

## Asset Management



### Condition monitoring

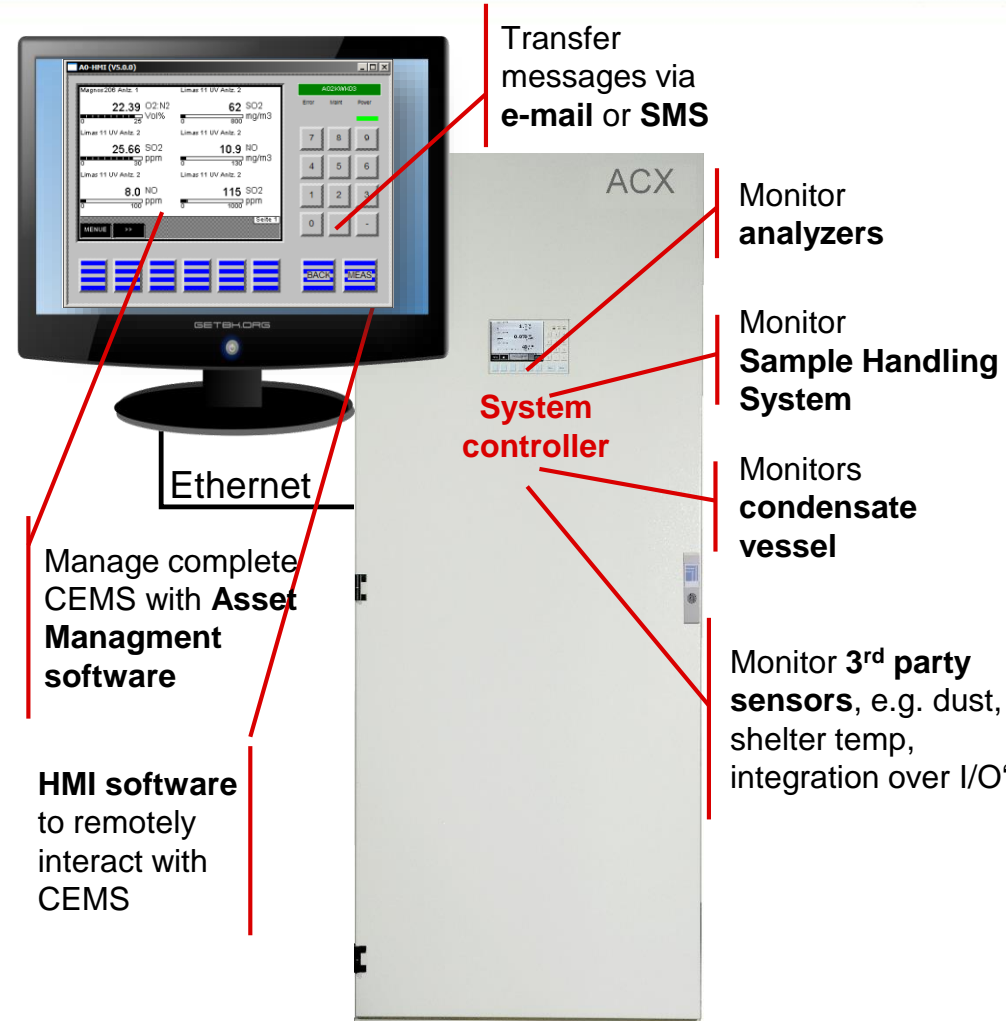
- ABB analyzer, e.g. calibration status
- Sample Handling System, e.g. loss of flow, temp. deviations
- 3<sup>rd</sup> party sensors via internal ABB PLC

### Remotely interact with CEMS

- Check CEMS status
- View data, e.g. pollutants and other parameters
- Configure analyzer, e.g. range switching, validations, etc.
- View trends, etc.

### Maintenance and troubleshooting

- Analyze logs for calibration / status messages
- View temperatures, flows and pressure parameters
- Actuate calibration cell, e.g. for validations



# The solution

## New technologies for service

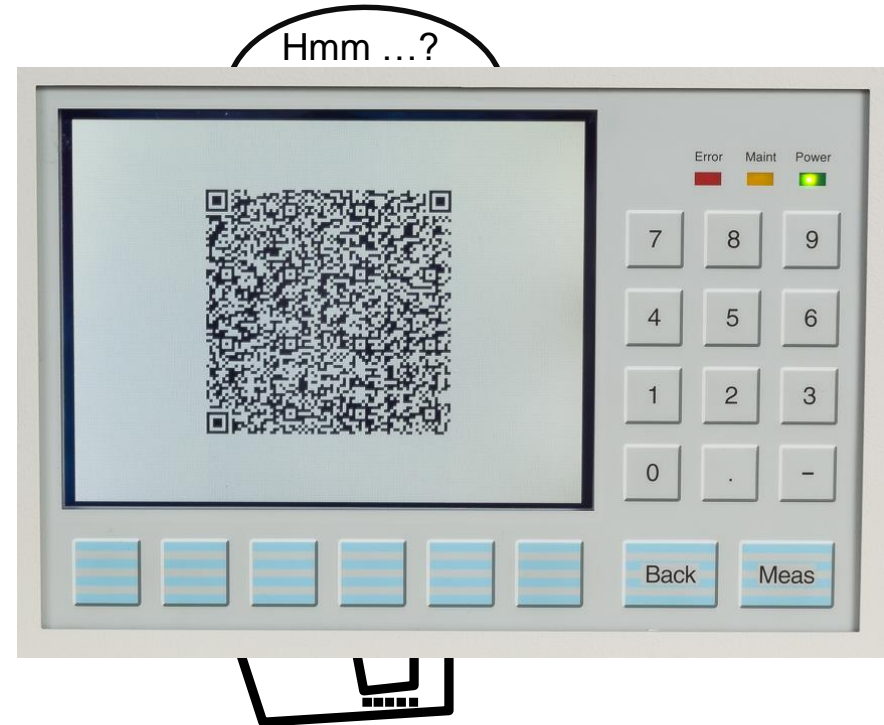
### Troubleshooting

#### Conventional

- Telephone troubleshooting

#### Smart support by dynamic QR code

- read code from your analyzers display with smartphone or tablet
- send information to local support center for fast support
- High simplicity: standardized, platform-independent
- Increased availability: case-specific information and individual support



QR code can reduce down time

# Considerations when selecting a CEMS

## Summary



### Issues

- Availability of documentation
- Training efforts
- Availability of CEMS
  
- OPEX cost
  
- Safety issues
- Supplier Services

### Solutions

- **Standardized documentation** for operation & inspection manuals, technical drawings, etc. are available from the 1<sup>st</sup> day of ordering
- **Standardized solutions** require a one-time training only
- **Condition monitoring** is built-into the CEMS
- Asset Management software - dedicated for maintenance staff - allows for global remote maintenance on standard Ethernet
- **Dynamic QR code** optimizes the time for diagnosis
- **Calibration cells** are a surrogate for test gases
- **Calibration cells** avoid handling with toxic test gases

**Thank You!**

